# DL05 I/O Specifications

D0-05DR-D <--->

Wiring diagram and specifications

D0-05DR-D Specifications		
DC Power Supply Specifications	**Voltage Range**	12-24VDC 20W max.
DC Input Specifications	**Number of Input Pts.**	8 (sink/source)
	Number of Commons	2 (isolated)
	Input Voltage Range	12-24VDC
	Input Impedance	(X0-X2) 1.8K @ 12-24VDC (X3-X7) 2.8K @ 12-24VDC
	On Current/ Voltage Level	>5mA/10VDC
	OFF Current/ Voltage Level	<0.5mA/<2VDC
	Response Time	X0-X2 / X3-X7
	OFF to ON Response	<100µs / <8ms
	ON to OFF Response	<100µs / <8ms
	Fuses	None
Relay Output Specifications	**Number of Output Points**	6
	Number of Commons	2 (isolated)
	Output Voltage Range	6-240VAC, 47-63Hz 6-27VDC
	Maximum Voltage	264VAC,30VDC
	Maximum Output Current	2A/point 6A/common
	Maximum Leakage Current	0.1mA @ 246VAC
	Smallest Recommended Load	5mA @ 5VDC
	OFF to ON Response	<15ms
	ON to OFF Response	<10ms
	Status Indicators	Logic side
	Fuses	None (external recommended)
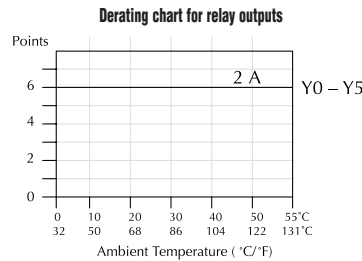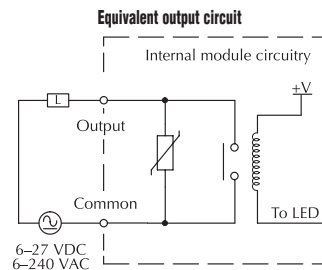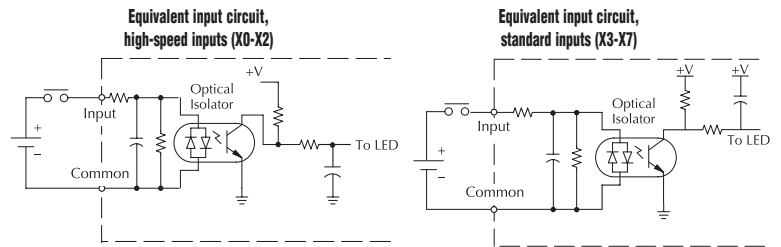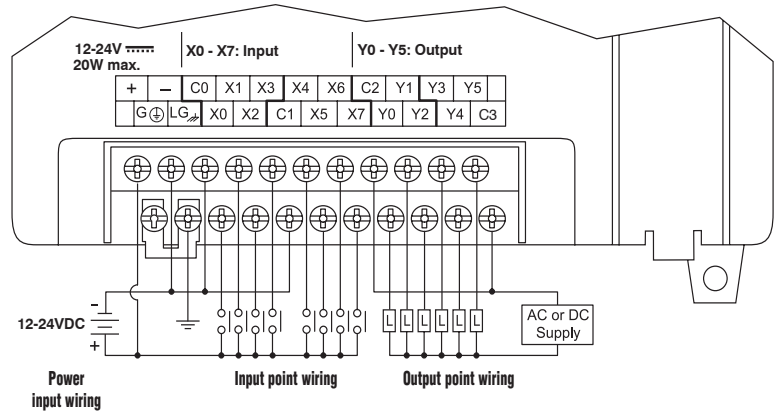
Typical Relay Life (Operations) at Room Temperature		
Voltage and Type of Load	**Load Current**	
	1A	**2A**
24 VDC Resistive	600K	270K
24 VDC Solenoid	150K	60K
110 VAC Resistive	900K	350K
110 VAC Solenoid	350K	150K
220 VAC Resistive	600K	250K
220 VAC Solenoid	200K	100K

Power input wiring — Input point wiring — Output point wiring

Equivalent input circuit, high-speed inputs (X0-X2)

Equivalent input circuit, standard inputs (X3-X7)

Equivalent output circuit

Derating chart for relay outputs

Features at a Glance

The DL05 and DL06 micro PLCs are complete self-contained systems. The CPU, power supply, and I/O are all included inside the same housing. Option modules are available to expand the capability of each PLC family for more demanding applications. The standard features of these PLCs are extraordinary and compare favorably with larger and more expensive PLCs.

The specification tables to the right are meant for quick reference only. Detailed specifications and wiring information for each model of the DL05 and DL06 PLCs begin on page 2–33.

Program capacity

Most boolean ladder instructions require a single word of program memory. Other instructions, such as timers, counters, etc., require two or more words. Data is stored in V-memory in 16-bit registers.

Performance

The performance characteristics shown in the tables represent the amount of time required to read the inputs, solve the Relay Ladder Logic program and update the outputs.

Instructions

A complete list of instructions is available at the end of this section.

Communications

The DL05 and DL06 offer powerful communication features normally found only on more expensive PLCs.

Special features

The DC input and DC output PLCs offer high-speed counting or pulse output. Option module slots allow for discrete I/O expansion, analog I/O, or additional communication options.

DL05 CPU Specifications

System capacity
Total memory available (words). 6K
Ladder memory (words) 2,048
V-memory (words) 4,096
   User V-memory 3,968
   Non-volatile user V-memory 128
Battery backup . . . . Yes[1]
Total built-in I/O 14
   Inputs 8
   Outputs. 6
I/O expansion. . . . . Yes[1]

Performance
Contact execution (Boolean) 0.7µs
Typical scan (1K Boolean)[2] . . . . 1.5-3ms.

Instructions and diagnostics
RLL ladder style . . . . Yes
RLLPLUS/flowchart style (Stages) Yes/256
Run-time editing . . . . Yes
Scan . . . . Variable/fixed
Number of Instructions. 133
Types of Instructions:
   Control relays. 512
   Timers 128
   Counters. 128
   Immediate I/O . . . . Yes
   Subroutines . . . . Yes
   For/next loops . . . . Yes
   Timed interrupt . . . . Yes
   Integer math . . . . Yes
   Floating-point math. . . . . No
   PID . . . . Yes
   Drum sequencers . . . . Yes
   Bit of word . . . . Yes
   ASCII print . . . . Yes
Real-time clock/calendar . . . . Yes[1]
Internal diagnostics. . . . . Yes
Password security. . . . . Yes
System and user error log . . . . No

Communications
Built-in ports . . . . Two RS-232C
Protocols supported:
   K-sequence (proprietary protocol). . . . . Yes
   DirectNet master/slave . . . . Yes
   Modbus RTU master/slave. . . . . Yes
   ASCII out . . . . Yes
Baud rate
     Port 1. . . . . 9,600 baud (fixed)
     Port 2. . . . . selectable 300-38,400 baud
     . . . . (default 9,600)

Specialty Features
Filtered inputs . . . . Yes[3]
Interrupt input . . . . Yes[3]
High speed counter . . . . Yes, 5kHz[3]
Pulse output. . . . . Yes, 7kHz[3]
Pulse catch input . . . . Yes[3]

1- These features are available with use of certain option modules. Option module specifications are located later in this section.

2- Our 1K program includes contacts, coils, and scan overhead. If you compare our products to others, make sure you include their scan overhead.

*3- Input features only available on units with DC inputs and output features only available on units with DC outputs.*

DL06 CPU Specifications

System capacity
Total memory available (words) 14.8K
Ladder memory (words). 7680
V-memory (words). 7616
   User V-memory 7488
   Non-volatile user V-memory 128
Built-in battery backup (D2-BAT-1) . . . . Yes
Total I/O 36
   Inputs 20
   Outputs. 16
I/O expansion. . . . . Yes[1]

Performance
Contact execution (Boolean) 0.6µs
Typical scan (1K Boolean)[2] . . . . 1-2ms.

Instructions and diagnostics
RLL ladder style . . . . Yes
RLLPLUS/flowchart style (Stages) Yes/1024
Run-time editing . . . . Yes
Scan . . . . Variable/fixed
Number of Instructions. 229
Types of Instructions:
   Control relays 1024
   Timers 256
   Counters. 128
   Immediate I/O . . . . Yes
   Subroutines . . . . Yes
   For/next loops . . . . Yes
   Table functions . . . . Yes
   Timed interrupt. . . . . Yes
   Integer math . . . . Yes
   Trigonometric functions . . . . Yes
   Floating-point math . . . . Yes
   PID . . . . Yes
   Drum sequencers . . . . Yes
   Bit of word . . . . Yes
   Number type conversion . . . . Yes
   ASCII in, out, print . . . . Yes
   LCD instruction . . . . Yes
Real-time clock/calendar . . . . Yes
Internal diagnostics. . . . . Yes
Password security. . . . . Yes
System and user error log . . . . No

Communications
Built-in ports: . . . . One RS-232C
    . . . . One multi-function RS232C/RS422/RS485
NOTE: RS485 is for MODBUS RTU only.
Protocols supported:
   K-sequence (proprietary protocol). . . . . Yes
   DirectNet master/slave . . . . Yes
   Modbus RTU master/slave. . . . . Yes
   ASCII in/out . . . . Yes
Baud rate
     Port 1. . . . . 9,600 baud (fixed)
     Port 2. . . . . selectable 300-38,400 baud
     . . . . (default 9,600)

Specialty Features
Filtered inputs . . . . Yes[3]
Interrupt input . . . . Yes[3]
High speed counter . . . . Yes, 7kHz[3]
Pulse output. . . . . Yes, 10kHz[3]
Pulse catch input . . . . Yes[3]

1- These features are available with use of certain option module. Option module specifications are located later in this section.

2- Our 1K program includes contacts, coils, and scan overhead. If you compare our products to others, make sure you include their scan overhead.

3- Input features only available on units with DC inputs and output features only available on units with DC outputs.

Features at a Glance

*Direct*SOFT software

The DL05 and DL06 PLCs use the same familiar *Direct*SOFT programming software that our larger PLCs use. We now offer a special FREE version of *Direct*SOFT which gives you all the great new features of the full version, but with a 100-word download restriction. For programs larger than 100 words, the full package is required. The FREE PC-DS100 software may be sufficient to program the DL05 and DL06. If you are programming with a full package version prior to v5.0, you will need v2.4 or later for the DL05 PLCs and v4.0 or later for the DL06. We always recommend the latest version for the most robust features.
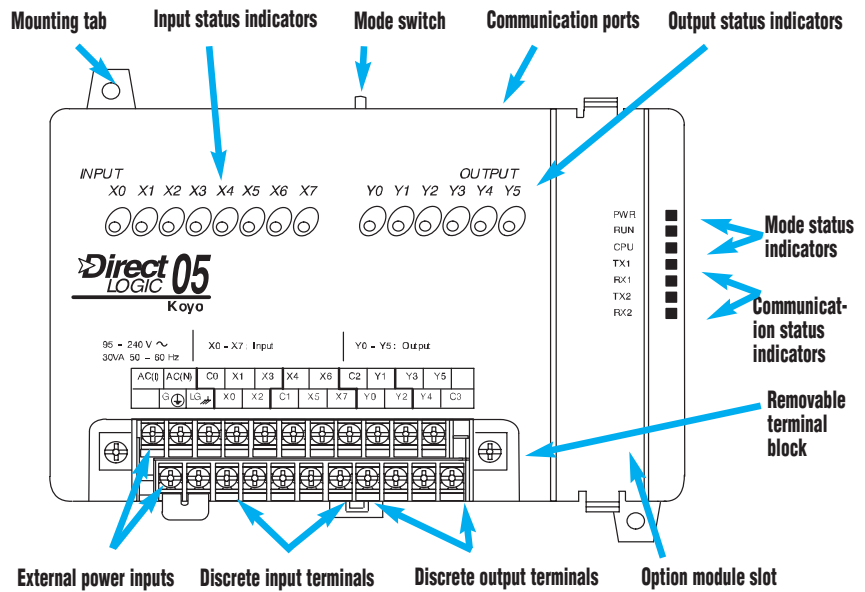
Hardware features diagrams
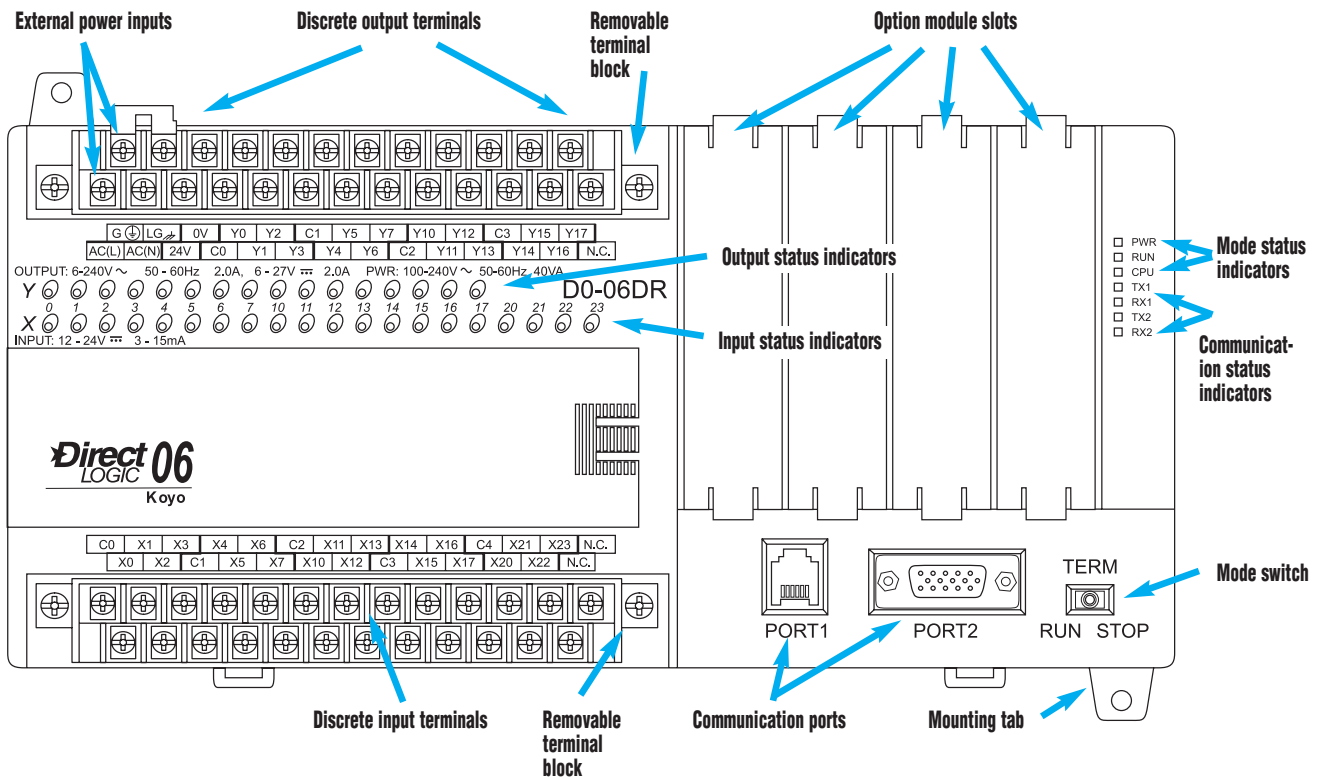
Automation Direct

PLC Overview

DL05/06 PLC

DL105 PLC

DL205 PLC

DL305 PLC

DL405 PLC

Field I/O

Software

C-more HMIs

Other HMI

AC Drives

Motors

Steppers/ Servos

Motor Controls

Proximity Sensors

Photo Sensors

Limit Switches

Encoders

Pushbuttons/ Lights

Process

Relays/ Timers

Comm.

TB's & Wiring

Power

Enclosures

Appendix

Part Index

Product Dimensions and Installation

It is important to understand the installation requirements for your DL05 or DL06 system. Your knowledge of these requirements will help ensure that your system operates within its environmental and electrical limits.

Plan for safety

This catalog should never be used as a replacement for the user manual. You can purchase, download free, or view online the user manuals for these products. The D0-USER-M is the publication for the DL05 PLCs, and the D0-06USER-M is the publication for the DL06 PLCs. The D0-OPTIONS-M is the user manual for the option modules. These user manuals contain important safety information that must be followed. The system installation should comply with all appropriate electrical codes and standards.
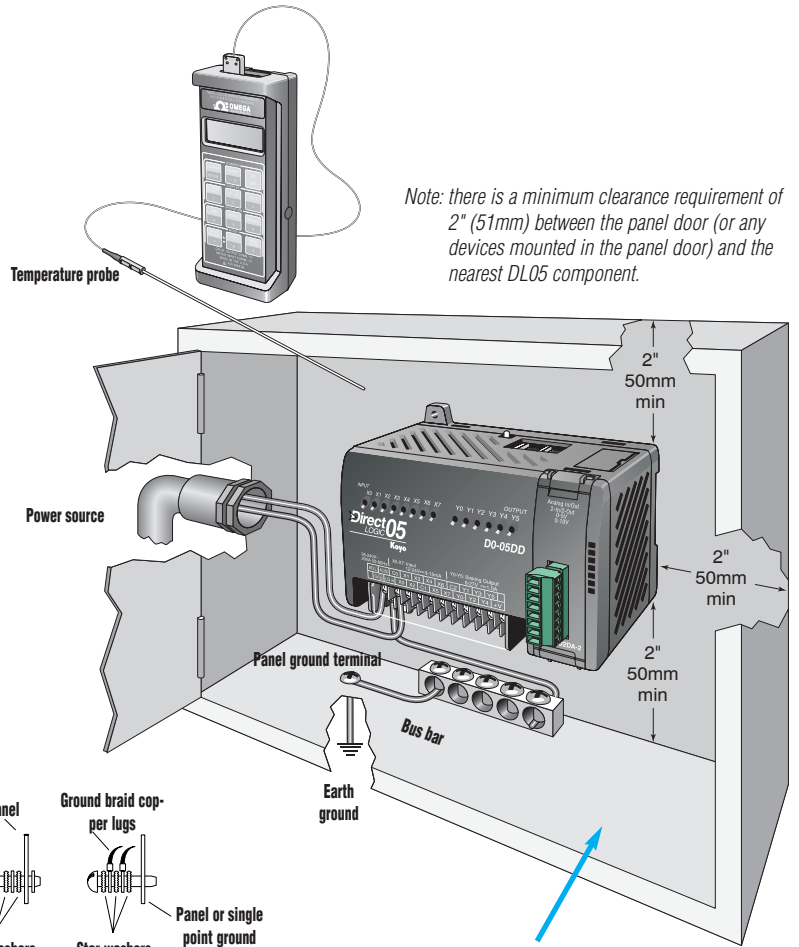
Note: there is a minimum clearance requirement of 2" (51mm) between the panel door (or any devices mounted in the panel door) and the nearest DL05 component.

Temperature probe

Power source

2"
50mm
min

D0-05DD

2"
50mm
min

Panel ground terminal

2"
50mm
min

Bus bar

Earth ground

Panel

Ground braid copper lugs

Star washers   **Star washers**   **Panel or single point ground**

See the enclosure section of this desk reference to find an enclosure that fits your application.

1.5"
38mm
min

D0-06DR

LCD PANEL
16X2 CHARACTERS

1.5"
38mm
min

PORT1   PORT2   RUN   STOP

1.5"
38mm
min
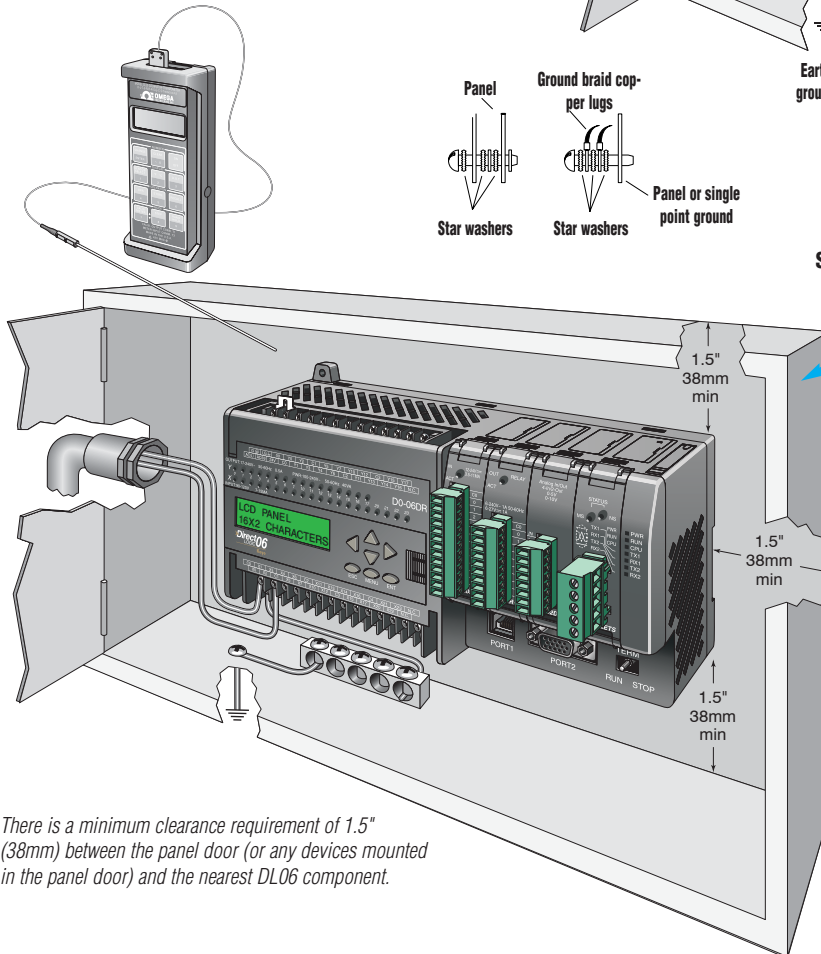
Note: There is a minimum clearance requirement of 1.5" (38mm) between the panel door (or any devices mounted in the panel door) and the nearest DL06 component.

| Environmental Specifications for DL05 and DL06	
Storage Temperature	-4º F-158ºF (-20ºC to 70ºC)
Ambient Operating Temperature	32ºF-131ºF (0º to 55ºC)
Ambient Humidity	5 to 95% relative humidity (non-condensing)
Vibration Resistance	MIL STD 810C Method 514.2
Shock Resistance	MIL STD 810C Method 516.2
Noise Immunity	NEMA (ICS3-304)
Atmosphere	No corrosive gases

Product Dimensions and Installation
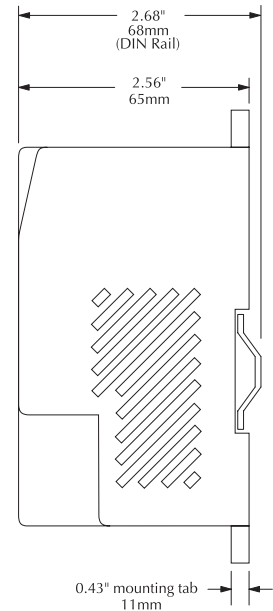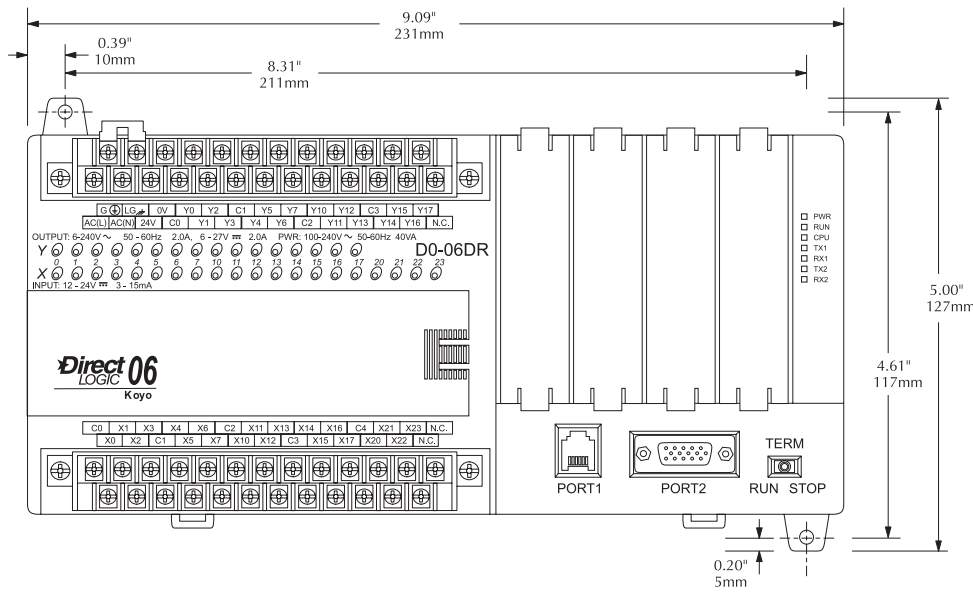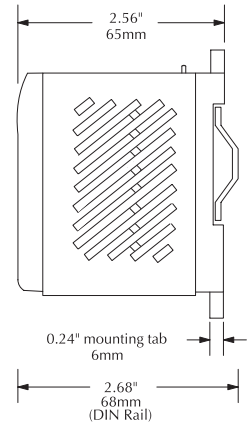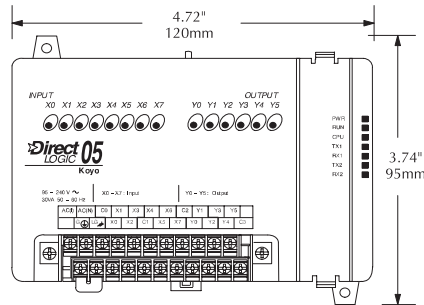
Unit dimensions and mounting orientation

DL05 and DL06 PLCs must be mounted properly to ensure ample airflow for cooling purposes. It is important to follow the unit orientation requirements and to verify that the PLC's dimensions are compatible with your application. Notice particularly the grounding requirements and the recommended cabinet clearances.
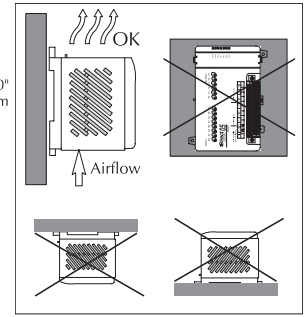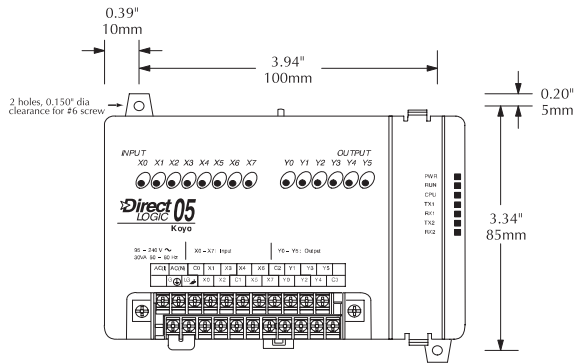
Mounting orientation
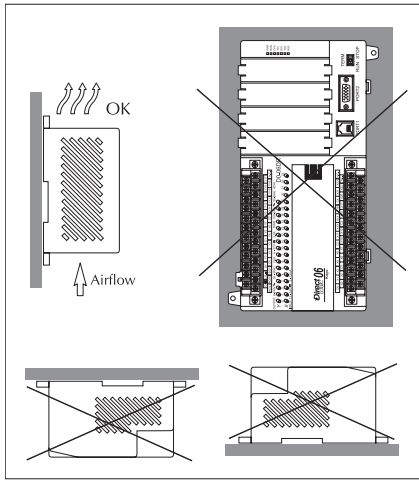
Mounting orientation

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